

REMARKS

The Office Action mailed March 19, 2007, and made final, has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-19 are now pending in this application. Claims 1-7 stand rejected. Claims 8-19 have been withdrawn.

The rejection of Claims 1-7 under 35 U.S.C. § 103(a) as being unpatentable over Randolph, Jr. et al. (U.S. Pat. No. 6,453,211) ("Randolph") in view of Applicants' Admitted Prior Art ("AAPA") and further in view of Burke et al. (U.S. Pat. No. 6,508,000) ("Burke") is respectfully traversed.

Randolph describes a method of repairing blades (12b) of a blisk (12). The method includes cutting away bend damage (32) of the blade (12b) to form a cutout (46) at a leading edge (42) of the blade (12b). The cutout (46) is then filled with weld material or an insert welded metallic spade to form a weld repair (48) which is larger than a nominal configuration of the blade (12b). Randolph also describes that "[i]n a recent development program, the weld repair of titanium blisk for a gas turbine compressor application is being explored. Damage to the relatively thin leading or trailing edges of an individual blade may be repaired by removing the damaged portion and weld repairing the remaining cutout." (col. 2, lines 14-19). Notably, Randolph does not describe nor suggest a method that includes determining a portion of titanium alloy material to be removed based on a determined maximum chord reduction limit. Further, Randolph does not describe nor suggest a method that includes depositing titanium weld material onto a cutback.

AAPA merely describes a method of repairing a turbine compressor blade by mechanically removing a worn and/or damaged tip area and adding a material deposit to the tip area to reform the area to the desired dimension. Notably, AAPA does not describe nor suggest a method that includes determining a portion of titanium alloy material to be removed based on a determined maximum chord reduction limit. Further, AAPA does not describe nor suggest a method that includes depositing titanium weld material onto a cutback.

Burke describes a method for repairing airfoil blades (3, 18, and/or 42) along a leading, a trailing edge, or a tip. The method includes removing a portion of the airfoil (3,

18, and/or 42) and replacing the portion with an insert (1). More specifically, the insert (1) is transient liquid phase bonded to the original airfoil (3, 18, and/or 42). To use transient liquid phase bonding, the insert (1) must be crystallographically and structurally aligned with the original airfoil (3, 18, and/or 42) to avoid forming discontinuities across a bond line. More specifically, the insert (1) has the same grain/crystal size, alignment, and/or orientation as the original airfoil (3, 18, and/or 42). Mismatches in grain/crystal size, alignment, and/or orientation produce deleterious grain boundaries within the bond. When repairing an airfoil tip, the insert (1) is one to three inches in radial length. A bond medium, or bond foil, for the transient liquid phase bonding must match the chemistry of the insert (1) and airfoil (3, 18, and/or 42) material to form a uniform microstructure and chemical composition along the bond line. Titanium is removed from the bond foil to avoid deleterious gamma prime eutectics at a bond center line. Notably, Burke does not describe nor suggest a method that includes depositing titanium weld material onto a cutback. Further, Burke does not describe nor suggest a method that includes determining a portion of titanium alloy material to be removed based on a determined maximum chord reduction limit.

Claim 1 recites a method of repairing a gas turbine engine compressor blade airfoil, said method comprising "determining a maximum chord reduction limit . . . determining a portion of titanium alloy material to be removed based on the determined maximum chord reduction limit . . . removing the determined portion of titanium alloy material from along leading and trailing edges of the airfoil, and along an entire edge area of a radially outer tip of the airfoil to form respective leading edge, trailing edge, and tip cut-backs which each define cut-back depths, wherein the edge area extends from the leading edge to the trailing edge . . . depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs . . . and removing at least some of the titanium weld material to obtain pre-desired finished dimensions for the leading and trailing edges, and radially outer tip."

None of Randolph, AAPA, and Burke, considered alone or in combination, describes or suggests a method of repairing a gas turbine engine compressor blade airfoil as recited in Claim 1. More specifically, none of Randolph, AAPA, and Burke, considered alone or in combination, describes or suggests a method that includes determining a maximum chord reduction limit. Furthermore, none of Randolph, AAPA, and Burke, considered alone or in combination, describes or suggests a method that includes determining a portion of titanium alloy material to be removed based on a determined maximum chord reduction limit.

Moreover, none of Randolph, AAPA, and Burke, considered alone or in combination, describes or suggests a method that includes depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs. Rather, in contrast to the present invention, Randolph describes removing damaged leading and trailing edge portions of a titanium blisk and weld repairing the blisk, AAPA merely describes removing a damaged tip area and adding a material deposit to only that portion of the tip area, and Burke describes an insert transient liquid phase bonded to an airfoil to create a bond with a uniform microstructure and chemical composition.

Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Randolph in view of AAPA, and further in view of Burke.

Claims 2-7 depend, directly or indirectly, from independent Claim 1. When the recitations of Claims 2-7 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2-7 likewise are patentable over Randolph in view of AAPA, and further in view of Burke.

In addition, Applicants respectfully submit that the Section 103 rejection of Claims 1-7 is not a proper rejection. Obviousness cannot be established by merely suggesting that it would have been obvious to one of ordinary skill in the art to modify the weld repairing of Randolph with the material removal and replacement of AAPA and with the transient liquid bonded insert of Burke to arrive at the present invention. As explained by the Federal Circuit, “to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the Applicant.” In re Kotzab, 54 USPQ2d 1308, 1316 (Fed. Cir. 2000); MPEP 2143.01.

Furthermore, as is well established, the mere fact that the prior art structure could be modified does not make such a modification obvious unless the prior art suggests the desirability of doing so. See In re Gordon, 221 USPQ2d 1125 (Fed. Cir. 1984). Furthermore, the Federal Circuit has determined that:

[i]t is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that “[o]ne cannot

use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

In re Fritch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, “it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” In re Wesslau, 147 USPQ 391, 393 (CCPA 1965). Rather, some suggestion to combine such references and a reasonable expectation of success must both be found in the prior art, and not based on Applicants’ disclosure. In re Vaeck, 20 USPQ2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the cited art, nor any reasonable expectation of success has been shown, either explicitly or implicitly.

Specifically, there is no suggestion or motivation, explicitly or implicitly, within Randolph, AAPA, and/or Burke to combine Burke, AAPA, and/or Randolph to produce the claimed invention. Accordingly, since there is neither a teaching nor a suggestion in the cited art for the claimed combination, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Of course, such a combination is impermissible, and for this reason alone, Applicants respectfully request that the Section 103 rejection of Claims 1-7 be withdrawn.

Further, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 U.S.P.Q. 1125 (Fed. Cir. 1984). MPEP § 2143. In the Office Action, the Examiner alleges that it would be obvious to “have provided Randolph Jr. et al. with the repair of the outer tip as taught by AAPA including the necessary length and size of the repair as taught by Burke et al. . . .” However, Burke requires an insert that is crystallographically and structurally aligned with the airfoil and that has the same grain/crystal size, alignment, and/or orientation as the airfoil such that transient liquid phasing bonding may be used. Burke further requires that the blade tip inset be one to three inches in length. As such, it would not have been obvious to one skilled in the art to combine the welding of Randolph and AAPA with transient liquid phasing bonded insert of Burke. Such combination of Randolph and AAPA with Burke would not result in a

method that includes depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs, as required by Applicants' claimed invention.

Moreover, Burke requires the removal of titanium from a bonding foil to avoid formation of deleterious gamma prime eutectics at a bond line. As such, it would not have been obvious to one skilled in the art to combine the titanium blisks of Randolph with non-titanium bonding foil of Burke. Such combination of Randolph and AAPA with Burke would not result in a method that includes depositing titanium weld material onto the leading edge, trailing edge, and tip cut-backs, as required by Applicants' claimed invention. Accordingly, for this reason alone, Applicants respectfully request that the Section 103 rejection of Claims 1-7 be withdrawn.

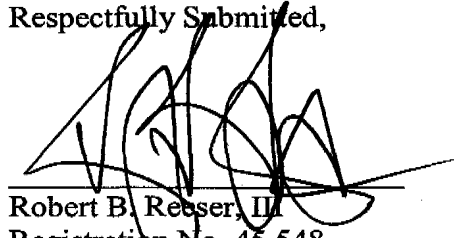
For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 1-7 be withdrawn.

The rejection of Claims 1-7 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over Claims 1-7, and 14 of U.S. Pat. No. 6,532,656 in view of Randolph is respectfully traversed.

The currently pending application and U.S. Patent No. 6,532,656 are, and were at the time of invention of the currently pending application, commonly owned by General Electric Company of Schenectady, NY. Submitted herewith is a Terminal Disclaimer disclaiming the terminal part of the statutory term of any patent granted from the present patent application which would extend beyond the expiration date of the full statutory term of U.S. Patent No. 6,532,656. In view of the submitted Terminal Disclaimer, Applicants respectfully request that the obviousness-type double patenting rejection of Claims 1-7 be withdrawn.

In view of the foregoing amendment and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'Robert B. Reusser, II', is written over a horizontal line.

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